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Tomato Growing

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TOMATO GROWING

Tomatoes are successfully grown in all parts of Ohio and take an important place in the state's agriculture; from 11,000 to 14,000 acres are planted annually.

In southern Ohio, the crop is grown mostly for the early market, as at Marietta, Letart, South Point, and Cincinnati, altho there are a few canning factories in that part of the state. In northern Ohio, the bulk of the crop is raised for canning factories. In addition, there is a considerable acreage near each city which supplies the local markets.

SOILS AND SITES

The tomato can be grown on a great variety of soils. A warm, sandy or gravelly loam, which is thoroly drained and has a southern exposure, is to be preferred for the early crop, while the mid-season and late crop does best on a well drained clay loam. However, crops of large yield and good quality are grown on heavy clay soils.

The soil should be abundantly stocked with organic matter, as this increases the moisture-holding capacity and makes the soil mellow and more easily worked. A good clover sod turned under will go far toward producing a good crop of tomatoes.

It is preferable not to choose a site on which tomatoes were grown the preceding year, as disease from that crop, living over on refuse and in the soil, will undoubtedly affect the new plants, especially if conditions for disease development are favorable.

VARIETIES

The choice of variety will depend on the use for which the crop is intended, and there is a wide selection of dependable sorts from which to choose.

Earliana—Probably the earliest, red, inclined to crack more or less around the stem, often with poor coloring. It is not grown as widely as a few years ago, altho a few strains are very much worth while.

Chalk's Jewel—Superior to Earliana, tho not as early in maturing.

Bonny Best.—Ripens between Earliana and Chalk's Jewel. Vines vigorous, prolific, somewhat susceptible to disease. Fruit round, red, ripens evenly, smooth, solid, and of good quality. One of the best early tomatoes and a favorite in southern Ohio.

John Baer—Grown principally for the early crop in this state. Fruit red, smooth, colors well. Not as popular as Bonny Best.

Globe—Medium early, purple variety, distinct globe shape, somewhat inclined to crack.

Stone—Standard late variety, grown especially for canning purposes. Plants must be started early to mature full crop.

Greater Baltimore—Grown for canning purposes, red, earlier than Stone, inclined to blossom-end rot.

Ponderosa—Purple variety, grown mostly in home gardens because of size and meaty flesh, quality good.

GROWING THE PLANTS

In some cases the grower may have a small plant house in which all seedlings are started. This, of course, is the ideal way of raising plants, but, to many, such a house is not available and hotbeds must be made to take its place.

Too much emphasis cannot be placed on the matter of the care and development of the plants. It has been repeatedly shown that early starting of plants and proper subsequent transplantings from hotbed to cold frame, as indicated later, produce short, stalky plants with good root systems, a condition largely influencing good stands and yields.

This fact has long been known to the early tomato producer and it is equally important to the canning-house grower. Canning-plant operators are growing millions of plants in hotbeds and plant houses for distribution to their men to insure a good yield on their contracted acreages.

TYPES OF HOTBEDS AND THEIR CONSTRUCTION

There are two types of hotbeds in use: the surface bed, or one in which the frame is placed on a flat pile of manure; and the pit bed, in which the manure and frame are placed in an excavation (see Fig. 1). The pit bed is more permanent and satisfactory, especially if tomatoes are included in a regular rotation.

The hotbed is preferably built in a protected place near the house, but well out of the shade of the trees and buildings, near a water supply, and in a well-drained spot facing south.

In constructing the hotbed, it is best to dig the pit in the fall and fill it with mulch to keep it from freezing. The pit should be 18 inches deep and wide enough to take care of the frame, or about 6 feet 4 inches. Drainage may be aided by digging a trench around the pit.

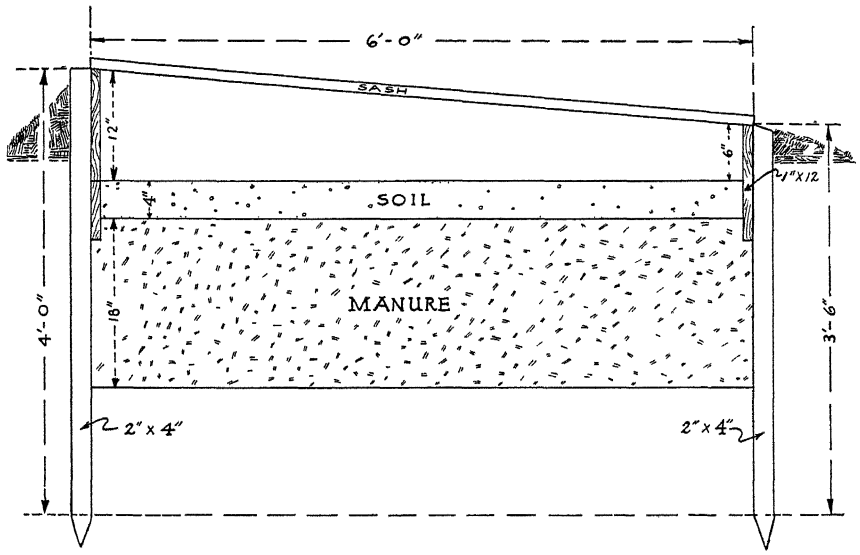

FIG. 1.—Hotbed (pit style)

If a permanent bed is desired the walls may be lined with boards, bricks, or concrete, and built to include the frame, this merely requiring filling with manure and soil to the proper depth each year.

The frame should be made to fit snugly at all edges, so that the heat may be conserved. The front or south side of the bed should be 6 inches lower than the opposite side, permitting a fuller use of the sunlight.

The sash may be of any size, altho if they are to be bought it will be best to buy the standard size, 6 feet by 3 feet. Sash may be obtained with either a single or double glass. The double glass, having a dead air space between them, conserve the heat, and are preferable for early hotbeds, but are harder to clean and heavier to handle than the single-glazed sash.

Fresh horse manure without much straw or litter should be used for heating the bed. Two weeks before time of seeding a sufficient quantity is thrown up in a pile. This is forked over every few days and the colder manure thrown towards the center, being allowed to heat evenly without burning. After the manure has heated thru, it should be spread evenly in the pit, each forkful being shaken out thoroly until there is sufficient to make a bed 18 inches thick when tramped down. In this tramping careful attention is paid to the corners to prevent uneven settling after the seed has been sown. After all the manure has been tramped fairly solid, it is advisable to shake in from 3 to 4 inches of loose straw, as this gives an equal distribution of heat and does away with "hot spots" in the bed.

The soil should be friable and loose; should contain a large amount of organic matter such as well rotted manure, leaf mold or straw; and about one-fourth sand, if possible. This allows even heating and proper drainage. About 4 inches of well-prepared soil should be used.

After the soil is in and the sash are in place the temperature will run very high. A thermometer should be placed in the bed, and when the temperature recedes to 85°, the seed may be planted.

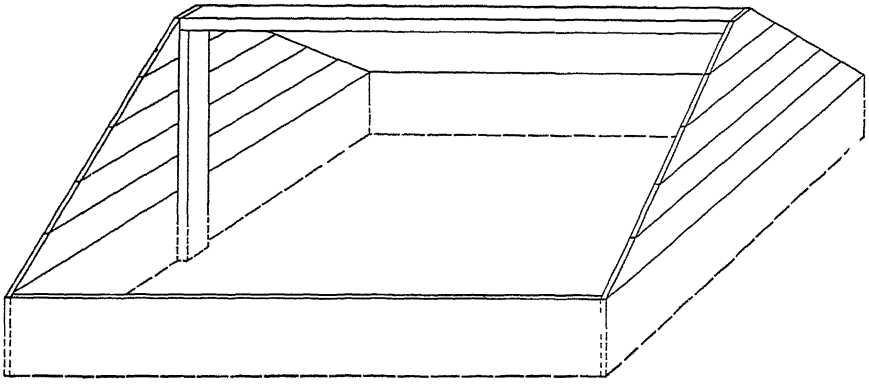

FIG. 2.—Cold frame. Cloth is stretched over the ridge pole in center, as shown in Fig. 3

COLD FRAMES

The cold frame may be built similar to the hotbed shown in Fig. 1, with the exception of having no bottom heat. Only a shallow pit is dug and a plank frame set in. Soil is used similar to that in the hotbed. The back of the frame is made 6 inches higher than the front and either glass sash or cloth is employed.

Another type of cold frame in use in southern Ohio is a plank frame 9 feet wide and as long as is needed. a ridge pole is used in the center and is fixed 2 feet 2 inches higher than the frame; cloth is then stretched from one side, over the ridge pole, to the other side (see Figs. 2, 3, and 4). This type has proven very satisfactory; it gives the seedlings room to grow without crowding and becoming spindly.

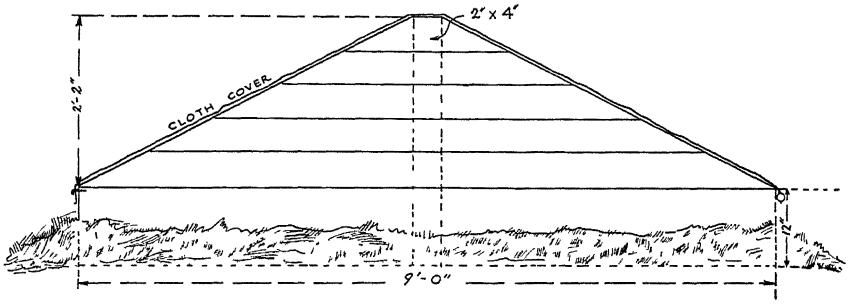

FIG. 3.—Side view of cold frame

The purpose of the cold frame is to harden off the plants raised in plant house or hotbed. As the plants are very tender it is not advisable to set them directly in the field before they become inured to cooler temperatures.

There is also an added advantage to the plants being shifted, as this stimulates a better root system and a more sturdy growth.

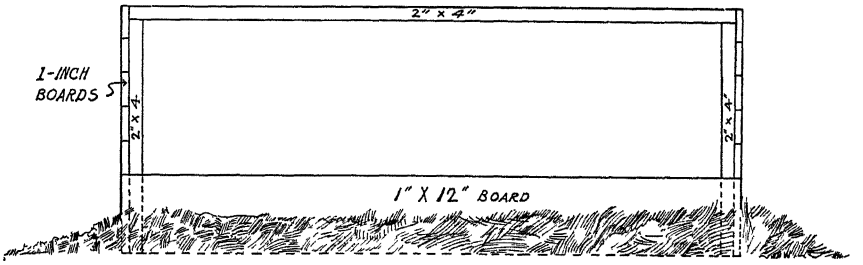

FIG. 4.—Cross section of cold frame

CARE OF THE HOTBED AND COLD FRAME

Seed should be sown from the middle of March to the middle of April. It may be sown either broadcast or in drills 2 inches apart. If planted in drills, about 5 to 10 seeds to the inch are planted, the seeds being covered very lightly. The soil should be from 70 to 85° Fahrenheit in temperature and moist enough for good germination.

After the seedlings are up, care must be used in watering and ventilating, for at this stage lack of air and too much moisture induces "damping off" and a large number of seedlings may be lost. Proper ventilation may be made by placing a block under one side of each sash. Fresh air must be given the beds for a short time during the warmer part of each day.

If the weather is severe the beds may need additional cover, especially at night. Mats of straw material, canvass, or boards may be used for this purpose.

When the true leaves have formed, the seedlings should be thinned in the drills and the extra plants set between the drills. This is usually about three weeks after the seed is planted. It is often advisable at this time to transplant all these seedlings, about 2 inches each way, to other hotbeds. This will require about 6 sash for each covering the original planting. The temperature should here range from 65 to 70°.

They are allowed to grow here until they crowd, when they must be transplanted again, this time to the cold frame, where they are set 4 by 4 inches or 6 by 6 inches. Here they remain until they are taken to the field.

Two sash seeded in drills 2 inches apart should produce enough plants to set 2 acres and allow discarding of inferior plants. A cold frame to care for this number of plants should be at least 9 feet wide by 100 feet long with the ridge type, or 6 feet wide and about 150 feet long if sash are to be used.

HARDENING OFF THE PLANTS

Plants grown in the hotbed are very tender and, as before mentioned, should never be set in the field until fully accustomed to cooler temperatures. During the warm part of the day air should be given daily. After they are transplanted to the cold frames, the season is usually far enough advanced so that during the noon period the cover may be left off for several hours at a time and replaced as the day advances and becomes cooler. As the time for field setting approaches, the cover may be left off for longer periods, until three or four days before transplanting, when the cover may be left off altogether.

TRANSPLANTING IN THE FIELD

In southern Ohio, a few plants are set in the field in the latter part of April, but these often suffer from frost; May 7 to 10 are safer planting dates. For central and northern Ohio, planting may follow from a week to two weeks later.

CULTURAL METHODS

In the Ohio River district where the plants are staked and tied, the distance of planting is usually from 2 to 2½ by 4 feet; where the plants are not staked the distance is increased to 4 by 5 feet.

In preparing a field for tomatoes, plowing should be done in the early spring and the soil worked occasionally until planting time, when it is thoroly pulverized and worked down. Furrows may be laid out in one direction, and when the plants are brought to the field cross furrows are made and the plants set at the intersections.

Previous to planting, the soil in the cold frame is thoroly watered and the plants kept moist until they are transplanted. As much dirt as possible is taken up with the plants so as to retain most of the root system.

In some sections transplanting is done with a plant setter, the plants being carried in a bucket partially filled with water. This method can be used especially when the plants are to be staked.

FERTILIZING THE CROP

The tomato shows a good return for a liberal application of a well-balanced fertilizer, as it must be well supplied with plant food if it is to produce a profitable crop.

On light soils, if no manure or clover is turned under, an application of from 500 to 1000 pounds per acre of a 3-12-4 is advisable. If 8 or 10 tons of manure are used, acid phosphate in amounts ranging from 500 to 1000 pounds per acre is usually sufficient. On heavier soils where no manure is to be used, an application of 2-12-2 or 2-14-2 at the above rate should be used; where manure is applied, acid phosphate will probably give the best results.

Fertilizers in amounts of over 200 pounds per acre are preferably drilled in or broadcasted, as large amounts applied directly to the row may be injurious, especially during hot, dry weather.

In the Marietta section, figures from the summary of the Truck Farm Survey records indicate that maturity of the fruit may be hastened from two to seven days by the application of from 500 to 1000 pounds of commercial fertilizer per acre. The soil in that section ranges from sand and gravel to heavy clays. From one year's work in Pike and Scioto Counties in heavy soils, the same results are indicated.

CULTIVATION

Cultivation is started immediately after the plants are set. It will be deep and thoro the first two times thru, but, as the season advances, it becomes more shallow and farther from the plant, as the roots are close to the surface of the soil and often crossfeed to the next row. Cultivation is continued as long as it is possible to go thru without injuring the plants.

It is advisable to seed either a catch or a cover crop, preferably a legume, with the last cultivation. In southern Ohio, it may well be cow peas or soybeans; for the central and northern part of the state, soybeans are to be preferred; or if a later planting is desired, vetch and rye is an excellent combination.

STAKING AND PRUNING

In the southern part of the state, the bulk of the early crop is staked and pruned. Where the plants are set by machine, staking is done just before the first cultivation; if the setting is done by hand, the land is furrowed one way and the stakes are driven before setting.

Staked tomatoes are usually pruned to a single stem, all the branches starting in the axils of the leaves being taken out. These branches, called suckers, will bear fruit if left on the vine, but retard the growth of those on the main stem. Tying is usually started 10 days or two weeks after transplanting in the field, the material used being soft twine or strips of cloth. The vines usually are tied and pruned from four to five times during the season, according to the growth made.

Experiments at the Ohio Experiment Station show larger yields from unpruned individual plants, but, as approximately twice the number of plants are used per acre when staked, this is offset to a large degree. The staked plant matures its fruit enough earlier that a profit for the additional expense is shown, the fruit is cleaner, of better quality, and not so likely to be attacked by disease.

There are also other advantages in favor of staking tomatoes, such as allowing a cover crop to be sown, the cultivation to be carried on thru a longer period, and spraying done more easily.

SELECTION OF SEED

A great deal may be accomplished toward increasing the yield and quality of the crop by the proper selection of seed. During the season the most promising individual plants should be marked and special note taken of the vigor of the plant, number of clusters, and the number of blossoms set in each cluster, the type of fruit, as to shape and size for that particular variety, and freedom from disease. In the early part of the season, twenty-five or thirty plants are so marked, and as the season progresses these are culled to five or six.

After these have grown to the point where the crop is maturing, note is made of the earliest and heaviest yielding plant; as the fruit matures, the tomatoes are picked off and those from each plant saved separately. The fruit is then quartered and the seed taken out, washed, and dried. Enough seed may be taken from one plant to seed an acre.

DISEASES

Fusarium Wilt—One of the most serious diseases in Ohio is fusarium wilt. This is a bacterial trouble usually first noticeable when the first cluster of fruit starts to ripen. At this time, the lower leaves turn yellow and droop. Only one side may be affected at first, but gradually both the leaves and stem are included, and a cross section of the stem will show discolored areas, finally the entire plant is attacked, and wilts and dries up. Occasionally, fusarium attacks young plants before any fruit has set and spreads very rapidly over the field, especially in hot, dry weather. This disease lives over in the soil, and, up to the present time, there is no known control for the field crop except the use of resistant strains of a few varieties.

Leaf Spot—Leaf spot is a serious disease, especially in southern Ohio. Small, dark spots with grayish centers appear on the leaves which turn brown and droop. The leaves dry rapidly and are stripped from the stem by the rains and wind, leaving the lower portion of the stalk bare. This disease usually starts at the base of the plant and works towards the top, spreading most rapidly during warm, wet weather.

Leaf spot may be controlled by spraying the plants with Bordeaux mixture. The first spray is given just before the plants are set in the field, a 2-2-50 strength solution being used. Spraying follows regularly at two-week intervals after the plants are set in the field, with 5-5-50 Bordeaux. From four to five applications in the field will be necessary and the leaves must be covered thoroly on both sides to obtain control.

HARVESTING

The degree of ripeness at which the fruit is harvested depends upon the method of marketing. In the Ohio shipping districts the fruit is picked as soon as it shows any pink color and packed in baskets or crates. For local market use the tomatoes should be allowed to obtain a full color, but still be firm in texture, as the best quality is contained in fruit ripened on the vine.